Synchrotron Infrared Chemical Mapping of Surface Treated Aluminum Alloy AA2024-T3 *	U4IR

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AA2024-T3 is an important aluminum alloy for aerospace applications. This analysis is part of an ongoing effort to determine the mechanism of chromate conversion coating for corrosion inhibition on aluminum alloys. Variations in surface cleaning/pretreatment before CCC application have been found to influence surface chemistry, composition and chemical heterogeneity. For example, rinsing in acetone prior to exposure to a salt mist (in the course of performing a typical electrochemical polarization) has been found to result in pitting through a photohemical reaction between acetone and copper-rich regions in the alloy surface. The figure below shows a chemical map of features associated with acetates and acetyl groups around a pit. Other surface pre-treatments, such as electropolishing and commercial deoxidizers, have also been found to produce a chemically heterogeneous surface. Some features of this heterogeneity, such as regions containing residual aliphatic hydrcarbons, are found to be associated with retention of activator compounds from chromate conversion coating treatments. This may have an impact on interfacial integrity, retention of trapped lattice water and other chemistry which may impact the mechanisms of chromate reaction and corrosion inhibition.

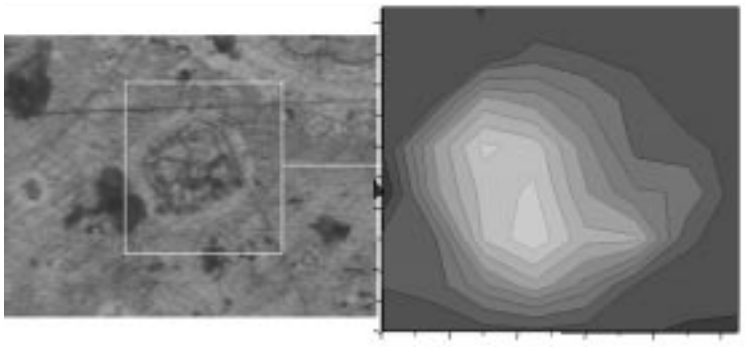

Figure 1. FTIR chemical map of carboxyl group frequency on AA2024-T3 near acetone-rinse induced pit

* This work supported by AFOSR MURI, contract officer Major Hugh DeLong, Ph.D.